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A SYSTEMATIC LITERATURE REVIEW OF UNIVERSAL AND TARGETED WORKPLACE INTERVENTIONS FOR DEPRESSION

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ABSTRACT

Background: Depression is increasingly being recognized as a significant mental health problem in the workplace contributing to productivity loss and economic burden to organisations. This paper reviews recent published randomised controlled trials (RCTs) of universal and targeted interventions to reduce depression in the workplace.

Methods: Studies were identified through searches of EMBASE, MEDLINE/PUBMED, PsychINFO, PsycARTICLES Full Text, Global Health and Social Policy and Practice databases. Studies were included if they included a RCT of a workplace intervention for employees targeting depression as the primary outcome.

Results: Twenty-two published RCTs investigating interventions utilising various therapeutic approaches were identified. CBT approach is the most frequently used in the workplace while interventions that combine different therapeutic approaches showed the most promising results. A universal intervention in the workplace that combines CBT and coping flexibility recorded the highest effect size (d = 1.45 at 4 months follow up). Most interventions were delivered in group format and showed low attrition rates compared to other delivery formats.

Conclusions: Although all studies reviewed were RCTs, the quality of reporting is low. Interventions using different therapeutic approaches with different modes of delivery have been utilised. Most of these interventions were shown to reduce depression levels among employees in the workplace, particularly those that combine more than one therapeutic approaches.

Keyword(s): systematic literature review; universal; targeted; workplace intervention; depression

WHAT THIS PAPER ADDS

- Previous systematic reviews on the subject area explored broad areas of common workplace mental health problems or universal interventions in which majority of these interventions were delivered face-to-face.
- Despite the increasing number of RCT studies investigating the effectiveness of workplace interventions for depression, it has not been reviewed comprehensively.
- The therapeutic approaches and the mode of delivery of workplace interventions for depression varied widely. However, workplace interventions which combine more than one therapeutic approaches appeared to be the most effective.
- There appears to be a recent trend towards interventions that utilise an element of technology (i.e. telephone, internet, computer, webpage) beyond the traditional face-to-face medium for evidence-based workplace interventions.
- Therapist support provided with the technology-oriented interventions (i.e. telephone, internet, computer, webpage) appears to have a strong influence on the treatment process and outcome. An ideal workplace intervention should integrate technological elements with therapist support to reduce attrition rates and increase the effectiveness of the interventions.

1.0 INTRODUCTION

Depression is a global disease affecting 300 million people worldwide [1]. It was identified as the second most major cause of disability worldwide [2] and one of the top three causes of disability in every region except high-income Asia Pacific [3]. In the UK, the overall cost of managing adult depression was estimated to be £9 billion in 2000, most of which are societal costs rather than treatment costs. It has however been estimated that £630 million are indirect treatment costs borne by the NHS as a result of the inability to work [4].

Notably, self-reported depression is the most frequent cause of workplace absenteeism in the UK [5] and is strongly associated with presenteeism [6]. Presenteeism is defined as a condition whereby an individual continues to come to work despite being ill [7]. In 2015/2016, work-related stress, depression and anxiety

accounted for 11.7 million lost working days with the average days lost per case of 23.9 days [8]. Depression also contributes to a significant loss of productivity [9]. In the UK, lost days of work due to depression and anxiety resulted in lost output of £17 billion, or 1.5% of UK gross domestic product [10].

It has been suggested that depression can be effectively prevented and managed particularly in workplace settings where large populations can be reached. For a number of years, stress management programs were considered as the most common strategy for mental health promotion in the workplace [11]. Although the target of stress management interventions is to reduce stress, they may very well improve mental health generally, including depression. A recent meta-analysis by Joyce et al. [12] reported that CBT-based stress management interventions substantially reduced mental health symptoms in the workplace although improvements in work-related outcomes such as absenteeism and work productivity were not significant. Workplace interventions or prevention strategies frequently now involve stress management programs that also focus on depression as the outcome. This indicates that although stress and depression are both distinct concepts, the terminology used in intervention programs may overlap with each other.

There have been some other systematic reviews about workplace interventions. The most recent was a systematic meta-review that systematically reviewed systematic reviews themselves, meta-analyses and review papers, on any randomised control trial (RCT) and non-RCT workplace interventions for depression and/or anxiety [12]. The review did not disentangle depression and anxiety, therefore it covered areas such as post-traumatic stress disorder. This review focuses on workplace interventions for depression, although it was also decided to include ‘stress management interventions’ that have depression as a main outcome. Furthermore, the meta-review did not calculate the effect size of the individual interventions independently and their overall analysis was based on the conclusions derived from the systematic review, meta-analysis and review papers.

Other systematic reviews on workplace interventions that have been carried out have not had the same focus as this one. One review focused on universal workplace intervention and excluded any targeted workplace interventions [13]. Another review identified 10 randomised controlled trials and 2 non-randomised controlled trials [14] but the authors concluded that only limited evidence can be drawn from these studies. There was also another review that focused solely on interventions that only targeted depression, but excluded any stress management interventions [15]. Nevertheless, stress management

interventions may decrease stress levels in addition to other mental health outcomes such as depression [12]. Additionally, given that there is an emerging number of interventions that utilise the use of technology such as telephone, web page, computer and apps specifically in the workplace, it was decided that a new systematic review needs to be conducted.

This systematic review therefore sought to evaluate the effectiveness of workplace interventions for depression in randomised controlled trials, investigating the efficacy of different therapeutic approaches involving both universal and targeted interventions. This review compares the effectiveness of the interventions and specifically the magnitude of effects based on the significance and effect sizes of results. Additionally, 'stress management interventions' were included in this review if they had depression as the primary outcome.

2.0 METHODS

Using the multiple database search interface OVID SP, the electronic databases of EMBASE, MEDLINE/PUBMED, PsychINFO, PsycARTICLES Full Text, Global Health and Social Policy and Practice were used to search from their earliest date to April 2016 for studies investigating the efficacy of workplace intervention targeting depressive symptoms. Articles had to be in the English language and published in peer-reviewed journals. The following terms and syntax were used for the literature search:

((employ* OR work* OR staff* OR perso*el OR supervis* OR team* OR manage* OR organi?ation OR office* OR industr* OR compan* OR institut*).ti.) AND ((treat* OR interven* OR therap* OR trial* OR promot* OR educat* OR seminar* OR workshop* OR program* OR course* OR efficac* OR effect*).ti.) AND ((depress*).ti. OR (depress*).ab. OR (absen* OR presenteeism).ti.)

The authors did not include stress or stress management in the syntax because the main aim was to search for any interventions for depression regardless of the generic name of the intervention. At the screening stage, papers were carefully scrutinised for the term depress* because some stress management studies actually targeted depression as their main outcome but the term depression was only mentioned in the abstract and not in the title. The term depress* was therefore searched for in the title as well as the abstract. In addition to the electronic search, the references of previous reviews and included articles were hand-searched for relevant studies.

2.1 Criteria for Included Studies

Population: male and/or female employees aged 18 – 65 years old with or without depressive symptoms. Studies focusing on alcohol or other substance abuse or dependence disorders, post-traumatic stress disorder, pre-natal, post-partum or other depression related to pregnancy, grief and/or bereavement were excluded. Studies recruiting subjects with severe comorbid mental health disorders other than depression were also excluded (i.e. schizophrenia, bipolar, PTSD).

Intervention: to be eligible, studies had to investigate the efficacy of prevention interventions, treatments, workshops, seminars, or any interventions, which were workplace-based or related to the application of skills in the workplace. Studies investigating the use of drugs, medication, supplements and physical exercise for depression were excluded. No restrictions were made with regard to the therapeutic approach used.

Comparator: randomised controlled trials with any comparator groups (i.e. second intervention, care as usual, no treatment, wait-list) were included.

Outcomes: only studies assessing depression as the primary outcome and using validated measures were included (e.g. BDI-II, BDI, CES-D, DASS, PHQ-9, HADS). This review focuses on interventions that are specifically tailored to reduce depression as the primary outcome, regardless of the other primary or secondary outcomes such as stress or other mental health conditions.

2.2 Selection of studies, risk of bias assessment and data extraction

Included studies were assessed in terms of methodology quality by using the Cochrane Risk of Bias assessment tool that addressed specific domains that can influence the risk of bias in a randomised control trial [16].

Search results were assessed using either the title, abstract and/or full text to determine whether it met the inclusion criteria. The review was reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [17]. Figure 1 displays the PRISMA flow diagram of the selection of studies process; see Appendix A for the completed PRISMA checklist.

The first and second author independently extracted data, including recruitment and screening processes, samples, selectivity (universal/targeted), age, country, mode of delivery, therapeutic model, description of intervention, duration, length of follow-up, outcomes, adherence, attrition, data analysis, results and participant's satisfaction. Where applicable, effect sizes (Cohen's d) were extracted or calculated using the difference of means between two groups and then dividing by the pooled standard deviation. Where there were only binary outcomes, odds ratio was converted to the standardized mean difference by using the formula [18]:

$$d = \text{LogOR} \times \frac{\sqrt{3}}{\pi}$$

Depressive symptoms are based on scores on validated depression scales or measures. As the review included a wide range of people offered both universal and targeted interventions, with change measured on different scales, 'levels of severity' were not used. The improvement of depressive symptoms is defined as the decrease in depression score from pre-treatment to the last follow up session. The percentage of attrition rate was calculated by extracting the number of subjects who withdrew or did not completed the last follow-up, divided by the number of subjects who were included in the intervention after randomisation.

3.0 RESULTS

3.1 Quantity of evidence available

A total of 8754 publications were identified from the online search and from the hand search (see Figure 1 PRISMA Flow Diagram). Of this, the number of publications included in this review is 22 and all were published between 1987 to 2015. As two studies were published in two different journals, with both papers reporting the same data, it was decided to only include the first publication of this data [19] and exclude the later one [20]. Another study discussed short-term [21] and long-term [22] effects of the same data and intervention in two different papers, therefore, were considered as one study. Table 1 and Table 2 summarise the description of the included studies.

Table 1: Summary of included studies utilising targeted approach

Authors	Country	Sample	Randomisation	Mode of delivery	Orientation	Comparator	Duration/ Sessions	Depression measures	Attrition rate
Blonk et al. (2006)	Netherlands	Employees unable to work due to psychological complaints	CI = 40 CBT = 40 Control group = 42	Individual	CI - CBT, REBT CBT	Second intervention No treatment	5 to 6, one-hour session 11 sessions	DASS	CI = 10/40 (25%) CBT = 10/40 (25%) Control = 13/42 (30.1%)
Chongruksa et al. (2012)	Thailand	Police officers	Eclectic group counselling - 26 Control group – 26	Group	CI - CBT, religious approach, art and reality therapy	Mental health psychoeducation	12, 1½-2 hours sessions	BDI-II	No data
de Vente et al. (2008)	Netherlands	Working patients with work-related stress	I-SMT - 28 G-SMT - 28 Control group – 26	Individual or Group	CBT	Second intervention CAU	12, 1 hour individual sessions 12, 2 hour group sessions	DASS	I = 6/28 (21.4%) G = 9/28 (32.1%) Control = 13/26 (50%)
Ebert et al. (2014)	Germany	Teachers with elevated depressive symptoms	iPST - 75 Waitlist control group - 75	Computerised	PST	Waitlist control group	5 lessons	CES-D	iPST = 14/75 (18.7%) Control = 9/75
Farzanfar et al. (2011)	USA	Employees at Boston Medical Center, Boston University, other companies, EMC Corporation and Florida Power & Light	TLC-Detect - 87 Control group - 77	Computerised	Unspecified	Screening module only	-	PHQ-9	Intervention = 10/87 (11.5%) Control = 2/77 (2.6%)
Furukawa et al. (2012)	Japan	Employees with subthreshold depression at a manufacturing company	tCBT + EAP - 58 Control group - 60	Telephone	CBT	TAU (EAP only)	8, 30-45 minutes sessions	BDI-II	tCBT = 5/58 (8.6%) Control = 1/60 (1.7%)

Geraedts et al. (2014)	Netherlands	Employees from 2 banking companies, 2 research institutes, 1 security company, and 1 university	Happy@Work web-based intervention - 116 Control group - 115	Computerised	CI - PST and CT	Care as usual	-	CES-D	Happy@Work = 42/116 (36.2%) Control = 19/115 (16.5%)
Grime (2004)	UK	London NHS occupational health department	cCBT 'Beating the Blues' + conventional care - 24 Control group - 24	Computerised	CBT	Conventional care	8 sessions	HADS	Beating the Blues = 10/24 (41.7%) Control = 5/24 (29.8%)
Lexis et al. (2011)	Netherlands	Employees identified at risk of sickness absence at a banking company	Intervention - 69 Control group - 70	Individual	CI - PST and CBT	CAU (from occupational health service)	7, 45 minutes session (maximum extension 5 sessions)	HADS	Intervention = 26/69 (37.7%) Control = 23/70 (32.9%)
Mino et al. (2006)	Japan	Employees at a manufacturing machinery company	Stress management group - 28 Control group - 30	Group and emails	CBT	Not explained	1, 4 hour group session and individual e-mail counselling	CES-D	Stress management group = 7/28 (25%) Control = 0/30 (0%)
Rose et al. (1998)	UK	Staffs in group homes of people with learning disabilities	Stress management program - 15 Control group - 23	Groups	Demands, Supports, Constraints model (Payne, 1979)	No intervention group	1 day or 2 half-day workshops	Thought and Feeling Index	Stress management program = 2/15 (13.3%) Control = 7/23 (30.4%)
Sallis et al. (1987)	USA	Employees at a 'high tech' company	RT - 26 MSM - 26 Education/Support comparison condition (ES) - 24	Group	RT - Progressive muscle relaxation (Bernstein and Borkovec, 1973 MSM - stress and coping process (Follick, Sallis and Fowler, 1981)	Second intervention Education/Support group	8 to 10, 1 hour sessions	BDI	RT = 3/26 (11.5%) MSM = 4/26 (15.4%) Control = 2/24 (8.3%)

Sandahl et al. (2011)	Sweden	Employees on sick leave 90 days on a minimum of 50% of full-time work with diagnosis of depression, dysthymia or maladaptive stress reaction	CGT - 40 FGT - 37 Comparison Condition (CC) - 40	Group and individual	Psychodynamic CT	Second intervention Treatment as usual and on waiting list	18, 90 minutes sessions	CPRS-S-A	CGT = 10/40 (10%) FGT = 7/37 (19%) Control = No data
Wang et al. (2007)	USA	Depressed workers enrolled in United Behavioral Health (UBH), a large managed behavioural health care company	Care management and telephone interview - 304 Control group - 300	Telephone	Unspecified	Usual care	-	QIDS-SR	Care management and telephone interview – 44/304 (14.5%) Control group – 30/300 (10%)

Abbreviations:

CAU – Care as usual
CBT – Cognitive Behaviour Therapy
cCBT – Computerised Cognitive Behaviour Therapy
CGT – Cognitive Group Therapy
CI – Combined Intervention
CT – Cognitive Therapy
EAP – Employees Assistance Programme
FGT – Focused Psychodynamic Group Therapy G-SMT - Group Stress management training
I-SMT - Individual Stress management training
iPST - Internet Problem Solving Therapy
MSM – Multicomponent Stress Management REBT – Rational Emotive Behaviour Therapy
RT – Relaxation Training
TAU – Treatment as usual
tCBT – Telephone Cognitive Behaviour Therapy
TLC – Telephone-Linked Communications

BDI-II – Beck Depression Inventory (2nd edition)
BDI – Beck Depression Inventory
CPRS-S-A – Comprehensive Psychopathological Rating Scale-Self-Affective
CES-D – Center for Epidemiologic Studies Depression Scale
DASS – Depression anxiety Stress Scale
QIDS-SR - Quick Inventory of Depressive Symptomatology

Table 2: Summary of included studies utilising universal approach

Authors	Country	Sample	Randomisation	Mode of delivery	Orientation	Comparator	Duration/ Sessions	Depression measures	Attrition rate
Bond and Bunce (2000)	UK	Employees in media organisation	ACT - 30 IPP - 30 Control group - 30	Group	ACT IPP - Unspecified	Second intervention Waitlist control group	3 half day sessions	BDI	ACT = 6/30 (20%) IPP = 9/30 (30%) Control = 10/30 (33.3%)
Cheng et al. (2012)	Hong Kong	Working adults from community centres	CBT and Coping flexibility - 54 CBT - 53 Control group - 54	Group	CI - CBT and coping flexibility CBT	Second intervention Waitlist control group	6, two hour sessions	CES-D	CI – 6/54 (11.1%) CBT = 7/53 (13.2%) Control = 12/54 (22.2%)
Elder et al. (2014)	USA	Secondary schoolteachers and support staff at a residential therapeutic school for students with behavioural problems	TM - 20 Waitlist control group - 20	Group (1 individual interview)	Meditation	Waitlist control group	2 didactic lectures and individual interview	Mental Health Inventory-5	TM – 3/20 (15%) Control = 1/20 (5%)
Imamura et al. (2014)	Japan	Employees from two companies that developed information technology systems and related services as their products	iCBT program using Manga (Japanese comic) story – 381 Control group - 381	Computerised	CBT	e-mail message on stress management information	6, 30 minutes per lesson	BDI-II	iCBT = 109/381 (28.6%) Control = 61/381 (16%)
Kojima et al. (2010)	Japan	White-collar workers at a non-ferrous metal manufacturer	CBT - 137 Control group - 124	Group and emails	CBT	Waitlist control group	1, 3 hour group session and 3 individual email sessions	CES-D	CBT = 56/137 (40.9%) Control = 63/124 (50.8%)

Manocha et al. (2011)	Australia	Employees at central business centre	Mental silence meditation (Sahaja Yoga) - 59 Relaxation meditation - 56 Control group - 63	Group (individual practice)	Meditation Meditation	Second intervention Waitlist control group	16, 1 hour sessions	depression dejection scale of POMS	Sahaja Yoga = 17/59 (28.8%) Relaxation meditation = 16/56 (28.6%) Control = 24/63 (38.1%)
Sheppard et al. (1997)	USA	Employees of a regional branch of a federal government agency	TM - 22 CSM – 22	Individual and group	Unspecified	Second intervention (CSM)	24, 1 hour sessions	IPAT Depression scale	TM = 5/22 (22.7%) CSM = 7/22 (31.8%)
Vuori et al. (2012)	Finland	Employees in city administrations, governmental organisations and private enterprises from various backgrounds	Group Training - 369 Control group - 349	Group	Social cognitive	Literature package reading	5, 4 hour (half-day) sessions or 3 full day sessions	BDI	Group Training - 45/369 (12.2%) Control group - 57/349 (16.3%)

Abbreviations:

ACT – Acceptance Commitment Therapy
CI – Combined Intervention
CBT – Cognitive Behaviour Therapy
CSM – Corporate Stress Management iCBT – Internet Cognitive Behaviour Therapy
IPP – Innovation Promotion Program
TM – Transcendental Meditation
BDI – Beck Depression Inventory
BDI-II – Beck Depression Inventory (2nd edition)
CES-D – Center for Epidemiologic Studies Depression Scale
POMS – Profile of Mood States

3.2 Recruitment and samples

The samples were recruited through a variety of means, using publicity or invitations to attend the program. For instance, one study recruited eligible and interested participants by local newspapers and other popular media [23] while another study conducted an introductory lecture on stress and overview of the research project [24].

3.3 Universal and targeted interventions

This review covers interventions that were offered to all employees (universal approaches) as well as interventions targeted to employees with a certain level of depressive symptoms. A total of 14 studies used a targeted approach while eight used a universal approach (refer Table 1 and Table 2). Targeted approaches involved employees with higher levels of psychological distress [25–28] stress or depression [21,22,29–32], sick leave [33,34], at risk of sickness absence [35] and sub-threshold or elevated levels of depression [36,37].

3.4 Assessment of risk of bias

Figures 2 displays the assessment of the risk of bias results. Only a few studies provided sufficient information to assess the risk of bias on all the domains. For example, only four of the 22 studies [23,36–38] provided any registration information of the trial protocol, so generally, there was a possible risk for reporting bias. Two of these studies provided trial registration information although the pre-specified outcomes in the trial registration did not match with the outcomes in the published papers [23,38]. One study also registered their trial retrospectively [37]. Four studies were evaluated to have a low risk of bias and two of the studies provided information about the trial registration for the assessment of reporting bias [19,23,32,37]. Some studies provided incomplete information for the risk of bias evaluation [26,34]. However, it should be noted that due to the nature of the psychological intervention, blinding of the participants and personnel was not possible in most of the studies.

3.5 Attrition rate

The overall attrition rate of included studies ranged from 8.6% to 41.7%. The intervention that recorded the lowest attrition rate was the telephone CBT [36] while the computerised intervention 'Beating the Blues' [33] recorded the highest attrition rate of 41.7%. The mean attrition rates for different intervention mode of delivery was 27.3% for individual (N = 4), 27.3% for computerised (N = 5), 23.5% for combination of group/individual (N = 7), 19.7% for group (N = 11) and 11.6% for telephone (N = 2).

3.6 Mode of delivery

In most studies (13), interventions were delivered through face-to-face sessions either individually or in groups. Five interventions used computerised delivery, while two interventions each utilised telephone interviews or a mode of delivery that combines face-to-face and individual emails. Of the five interventions utilising computerised delivery, two used the internet and two used computerised programmes while one used an automated phone system that screens and determines self-management or professional care options for the users.

3.7 Effectiveness of interventions

The effectiveness of the interventions was evaluated at the last post-treatment/follow-up sessions in different studies. The improvement of depressive symptoms is defined as the decrease in depression score from pre-treatment to the last follow up session. Overall, the majority of the interventions proved to be successful in reducing depressive symptoms. Figure 3 summarises the effect sizes of the included workplace interventions.

3.7.1 Combined interventions

A total of five interventions combined two or more therapeutic orientations [21,22,25,26,35,39]. All five interventions except one (from two papers) [21,22] indicated the superiority of the combined intervention as compared to the comparator interventions and/or control groups. One study [39] found a combined intervention with CBT and coping flexibility was much more effective than CBT alone when compared with the waiting list control condition at four months follow-up (d = 1.45), showing large effect size. The

authors suggest that the combined approach helped enhance participants' coping flexibility skills in the workplace and in maintaining lower levels of depressive symptoms over a longer period of time. Rather than focusing on the secondary control coping (identifying and modifying self-thoughts and emotions) as occurs with normal CBT intervention, more emphasis was given to the meta-skill component of coping flexibility for using these coping strategies in different situations.

3.7.2 Cognitive Behavioural Therapy (CBT) oriented interventions

Eight studies used the cognitive behavioural therapy (CBT) approach in their interventions. Six of these CBT-oriented interventions [30,33,36,38–40] reported improvements on depressive symptomatology. However, there were no differences between interventions as compared to control or care as usual in two of the interventions [25,29]. Although the difference was not significant in these two studies, depression levels still decreased [25]. Another study investigated telephone CBT plus employee assistance program (EAP) intervention. This found a moderate effect size (Effect size = 0.69) after four months as compared to EAP alone [36]. The computerised CBT intervention using 'Beating the Blues' reported moderate effect size (d = 0.26) at six months follow-up. Notably, this workplace-based intervention also reported high attrition rate and the results may have also been contaminated due to some participants completing the follow-up questionnaire without completing the intervention [33].

3.7.3 Meditation/relaxation interventions on depression symptoms

A mental silence meditation intervention called 'Sahaja Yoga' [23], was reported to be effective in reducing depression compared to the controls with small effect size (d = 0.4). This meditation technique focused on the present and requires the subject to sit quietly on a chair while eliciting a state of mental silence, which is based on yogic psychophysiology principles [23]. Further, a small effect size was also recorded for a different relaxation intervention in the same study as compared to the waitlist control group (d = 0.2). This study also reported high compliance rates in both interventions with around 81% participants attending the maximum number of classes.

4.0 DISCUSSION

The majority of the interventions were generally effective but varied with regard to effect size. Surprisingly, the highest effect size for studies that were assessed for risk of bias was recorded by an intervention by Cheng et al. [39] that utilised a universal approach. This contradicts the belief that universal interventions are very unlikely to produce large individual effect sizes [13], and are less effective as compared to targeted interventions [41]. This belief may be based on the understanding that the difference in terms of depressive symptoms before and after a targeted intervention are much more evident to those already experiencing high depressive symptoms in the first place. Nevertheless, it is also likely that interventions that are advertised as universal can still attract those with higher depressive symptoms. As seen in our review, the intervention with the highest effect size and acceptable risk of bias [39] reported the baseline scores on depression using CES-D of subjects in the combined intervention, CBT only and control group was relatively high (M = 24.53, M = 23.34, M = 24.92). Therefore, it was concluded that the effectiveness of an intervention does not necessarily depend on whether the intervention is universal or targeted, but more dependent on the subjects that are recruited.

In relation to this, the social ecological model [42] has suggested that individual, organisational and interpersonal levels of influence are important aspects of promoting health behaviour changes among employees. In the studies that utilised universal interventions, the common practice is that employees are recruited based on a voluntary process, so attendance was not restricted to only individuals with certain levels of symptoms. The fact that motivated employees volunteered and were attracted to take part in the first place may suggest that they are ready to commit to the behaviour change program [43].

Both approaches have their advantages and limitations. It was argued that targeted interventions are focused on high risk individuals, or those who are exposed to a significant level of risk that is deemed higher than average in which have more focused content specifically for certain population [44]. In contrast, universal interventions can reach more participants although it is much more difficult to infer directly the treatment effects in universal interventions because not all participants experience a certain level of depressive symptoms at baseline. However, this can also be seen as an advantage because universal interventions may approach other segments of the working population with varying stages of readiness for health behaviour change [43].

As expected, workplace interventions using a CBT-based approach were the most common and showed promising results. Consistent with previous review [13], our review supports the evidence for the effectiveness of CBT interventions in the workplace. Traditionally, the session lengths of CBT interventions are fixed at 30-45 minutes while the number of sessions ranged from six to 12 with a subsequent booster session [45]. Interestingly, our review found CBT interventions differed in terms of the number of sessions, duration and length of sessions, mainly due to its mode of delivery. CBT was originally introduced for individual treatment but has been adapted to groups and computerised forms. Despite the different forms of CBT interventions, the level of depression generally reduced after the intervention. However, the magnitude of effects also decreased with time, particularly where studies had longer follow-up periods.

Although CBT-based approaches have been most widely used in workplace intervention, it was found that interventions that used a combined approach were generally more effective than a single-therapeutic oriented intervention. A combined intervention is defined as interventions that utilises more than one therapeutic approaches (e.g. CBT and coping flexibility, CBT and religious therapy). Although potentially high in risk of bias, the CBT and coping flexibility intervention [39] was the most effective intervention with more integrated contents and structure when applied to the workplace setting.

In this review, studies that compared combined interventions had greater effectiveness as compared to single-therapeutic intervention and/or control group [25,26,35,39]. Indeed, in one study where this was compared, the effectiveness was higher in the combined version of the intervention as compared to the traditional single therapeutic intervention. Cheng et al. [39] themselves reported that the CBT plus coping flexibility intervention was found more effective than CBT alone. It is likely that an individual may face difficulties applying the acquired skills when handling various real-life stressful events. Therefore, integrating the individual aspects and the external systems of the organisation itself could be important when developing a workplace intervention or prevention programme. A more external-focused therapeutic approach such as coping flexibility emphasises the ‘constant, dynamic transactions between workers and their work environment’ [39] and empowers individual’s ability in dealing with different stressful situations using appropriate skills.

It can also be argued that the effectiveness of combined interventions may also simply be attributed to the fact that people learn a combination set of skills from diverse therapeutic approaches. From an individual therapy point of view, Stricker and Gold point out the advantages of psychotherapy integration where 'the integration of therapies involves the synthesis of the "best and brightest" concepts and methods into new theories and practical systems of treatment' [46]. Different individuals may also respond differently to different types of therapeutic approaches. Therefore, combining different approaches may provide them with more choices that enable them to choose skills that are well suited to them. For instance, religious values can build individual's potential internal resources [26] and may also be a big part of someone's life. A meta-analysis by Smith, Bartz and Richards [47] showed that spiritual-oriented interventions are beneficial for individuals with depression, anxiety, stress and eating disorders. This meta-analysis included 31 outcome studies and 52% of the included studies evaluated religious interventions combined with CBT.

The review also identified the development of different service delivery methods as compared to the more traditional face-to-face intervention. The emergence of technological developments has the potential to enhance medical care delivery and in-line with these technological developments, more interventions utilised elements of technology such as computers or the internet [33,37,38], telephone [32,36], psychotherapy with email feedback [30,40] and automated phone software programs [27].

However, it needs to be noted that the computerised intervention recorded the joint highest mean attrition rate compared to other delivery methods. This is consistent with the literature on computerised interventions, which showed high dropout rates [48]. The highest attrition rate was recorded by the unguided Beating the Blues by Grime [33] and minimally guided Happy@Work [21,22] with attrition rates of 41.7% and 36.2% respectively. However, lower attrition rates were reported for guided computerised interventions such as iPST [37] and the automated screening and intervention system [27] with attrition rates of 18.7% and 11.5% respectively. This is, therefore, consistent with the recent findings which reported that guided internet CBT intervention has comparable attrition rates to face-to-face CBT intervention, and better than the unguided intervention [49].

Guidance from a therapist whilst participants were using these interventions appeared helpful. Of relevance to this are a number of meta-analyses which found a strong influence of therapist support on the treatment process and outcome where interventions with little or no therapist contact had significantly

smaller effect sizes, higher attrition rates and lower adherence rates. [50–55]. Therefore, it can be inferred that the element of therapist support provided with the technology-oriented interventions is an important aspect of an intervention.

Among the included studies, interventions that were delivered through the telephone and group format recorded the lowest mean attrition rate. While only two interventions used the telephone, a large number of interventions (N = 11) used the group format to deliver depression intervention in the workplace. This may be attributed to the potential cost-effectiveness of implementing interventions for depression in groups as compared to individuals [56,57]. Although there were no differences in terms of depression symptoms and costs after individual and group CBT, previous research suggested that individual CBT was 1.5 times more expensive to provide in the community than group CBT [56]. Consequently, the workplace environment may be a suitable setting for conducting group interventions where a large number of employees can be reached [15].

4.1 Strengths and limitations

Our review highlights that in the occupational context, there are a variety of effective universal and targeted interventions for depression using different intervention approaches. Additionally, this evidence was also from RCT studies, which are considered as the gold standard for intervention evaluations [58]. This review managed to capture the diversity of studies available with regards to the effectiveness of the specific interventions that are compared using comparable effect size values. Furthermore, this review also considered the more recent emergence of interventions utilising computerised delivery methods as well as including targeted and universal interventions.

This review focused on universal and targeted interventions that are specifically tailored for depression and which considered depression as the primary outcome. Even though the review only includes RCTs, the overall quality of reporting for many of the studies is low. Most studies did not provide enough information for evaluating the risk of bias, while none were found to have a low risk of bias on all evaluation domains. Additionally, the small samples in majority of the studies and the absence of power calculations suggest that the studies were mostly underpowered and therefore reduce the clarity of conclusions derived from those studies.

Furthermore, a meta-analysis of studies included in this review was not advisable due to the diversity of studies with regards to the mode of delivery, therapeutic approaches and comparators. In addition, this review was only limited to English language articles published in peer-reviewed journals and excluded grey literature, so there are possibilities that some relevant trials were missed. In relation to this, the interventions within each studies were not checked in terms of compliance with the national treatment guidelines for depression as these guidelines relate to those with diagnosable depression.

4.2 Future recommendations

The current review found that most studies did not provide sufficient information for the evaluation of risk of bias as recommended by the Consolidated Standards of Reporting Trials (CONSORT) guideline [59]. It is highly recommended that trial researchers follow these guidelines in order to develop and conduct RCTs appropriately. Furthermore, contrary to the expectation that a single therapeutic approach may be more effective than another, interventions that combined more than one therapeutic orientation could be promising. However, the suitability of applying these combined interventions needs to be considered carefully to suit the work population and the mode of delivery merits careful thought.

The availability of databases for registering clinical trials is recent and needs to be utilised by the researcher to inform other researchers about the on-going or future trials planned within the knowledge area. These databases require registering information related to the pre-specified population, interventions, comparator and outcomes that may reduce the reporting bias in published materials. A number of studies showed effectiveness in interventions reducing depression in the workplace. However, most of the effects were immediate and short-term, so that more effort needs to be focused on maintaining the intervention effects for longer as well as preventing relapse.

With regards to power calculations, it is important to note that prospective power calculations prior to a study are crucial, as it is the ‘pre-study probability that the study will detect a minimum effect regarded as clinically significant’ [60]. Post hoc power calculations done after the study is conducted are not recommended but if they are, researchers need to state the 95% confidence interval to report the level of uncertainty in relation to the effect estimate [60].

5.0 CONCLUSION

In conclusion, this review included a number of universal and targeted interventions for depression in the workplace. Despite this, the quality of most studies, as indicated by the small samples, absence of power calculations and high risk of bias assessment suggested that the conclusions derived from the studies need to be interpreted with caution. Based on the review, an ideal workplace intervention for depression might comprise:

1) the intervention combining more than one therapeutic approaches relevant to the workplace. For example, the combination of CBT that focuses on intra and interpersonal skills, with coping flexibility which is a meta-skill that can be used to apply the CBT-skills effectively.
2) The integration of any technology-mediated interventions with therapist support to reduce attrition rates and potentially increase the effectiveness of the intervention.
3) Intervention delivered via group format may reduce numbers of attrition rates. It may also be able to reach more employees in the workplace.

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